FINAL REPORT

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"Basic Studies Related to Electric Vacuum Gyroscope Technology"

Under the Direction of
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Studies of electric vacuum gyroscope problems (described in the semiannual progress report)[1] have been carried out for the purpose of identifying those problems of a basic nature which could most profitably be carried out at the University. From this emerged a program of investigation into the causes of high voltage breakdown, a phenomena severely limiting the progress of gyro development for high G environments. In addition, three gyro units have been maintained in operating condition (but not always spinning) throughout the grant period for both life test purposes and to carry out gyro experiments as needed. One gyro failed during the year and it was determined that this was due to the development of a small leak in a gyro electrode high-voltage feedthrough. Air entering through this leak resulted in failure of the combination titanium-ion pump and vacuum gauge. Failures of minor significace in electric connectors to the vacuum gauges were noted and repaired several times during the period. Because of the basic nature of research interests and the availability of specialized apparatus, no other experiments were conducted with the gyro equipment.

The following material on the high-voltage breakdown studies is also being published as a separate report.[2]

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[1] "Initiation of Electrical Breakdown in Ultrahigh Vacuum," D. Alpert, D. A. Lee, E. M. Lyman, and H. E. Tomaschke, Journ. Vac. Sci. & Tech. 1, 35 (1964).

[2] Coordinated Science Laboratory Quarterly Progress Report, to be published.